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A RE-DESCRIPTION OF *PSEUDOCOCCUS COCOTIS* MASKELL, INCLUDING A DESCRIPTION OF THE MALE (HEM.)

By W. Cottier, M.Sc.

(*Assistant Entomologist, Plant Research Station, Palmerston North, New Zealand.*)

Communicated by Dr. D. Miller, F.R.E.S.

During 1933 specimens of coconut leaves and bark were received at this laboratory from the Resident Commissioner of Niue Island, and on examination they proved to be heavily infected with *Pinnaspis aspidistrae* Sign., and the mealy-bug *Pseudococcus cocotis* Mask. During the examination of the latter species it was realised how inadequate Maskell's description is for the identification of this insect, and since the male, previously unrecorded as far as I can determine, was discovered also, it was decided to prepare a re-description of the insect as far as the material available would allow. Most of the specimens from Niue Island were sent in alcohol, there being only a small supply of dried material, but from this latter several dried males were secured. One adult male and several immature males were obtained from the spirit specimens.

The slides of *P. cocotis* at present in the Maskell collection in the Plant Research Station museum and mounted by Maskell, are two, one of the larva and the other of an adult female, both slides being labelled "'*Dactylopius cocotis*,' 1891 W.M.M." Therefore they were not included amongst the specimens from which the original description was drawn up in 1889 (*Trans. N.Z. Inst.*, **22** : 149). Where these original type slides are I have been unable to discover. The two slides labelled 1891 were apparently made from material received by Maskell from Cotes of Calcutta, the insects having been collected from coconut on the Laccadive Islands (1891, *Trans. N.Z. Inst.*, **24** : 34). Apart from the date, the other evidence that points to the female on this slide as having been in this consignment from Cotes, is that the specimen has 7-segmented antennae, a point which Maskell describes, viz.: "Their colour (adult females) was yellowish instead of red and in some cases the antennae exhibited only 7 joints. In other respects, especially in the tufted hairs of the epidermis, they agreed with the type, and neither of the two points just mentioned is sufficient to raise them to specific rank."

The other material I have used for establishing the identity of the species consists of two adult females mounted from Maskell's dried type specimens which bear the number "78." In Maskell's manuscript index to the collection, opposite No. 78 there appears the following:—"*Dactylopius cocotis* Maskell—India, Fiji, insects in situ. N.Z. Trans. vol. xxii, p. 149, vol. xxiv, p. 34."

In drawing up the following descriptions I have also used several specimens received from Niue Islands in 1933.

Pseudococcus cocotis Maskell.

Maskell, W. M., 1889, *Trans. N.Z. Inst.*, **22** : 149.
—— 1891, *loc. cit.*, **24** : 34.

(1) *Adult* ♀. For external appearance *see* Maskell (1889). The specimens received from Niue Island, both in the dried state and in alcohol, were yellowish. The insect secretes much white mealy material. The *antennae* may be either 7- or 8-segmented and I have specimens with one of the antennae 7- and the other 8-segmented. All segments with hairs. The comparative lengths of the joints of the 8-segmented antennae are given in the following formulae. The numbers refer to the segments and are in order of decreasing length. Bracketed numbers mean that such segments are equal in length.

(*a*) 8, (1, 2,) 3, 7, (5, 6,) 4. (*b*) 8, (1, 2,) 3, (6, 7,) (4, 5,). (*c*) 8, (1, 2,) 3, (7, 5,) (4, 6,).

The commonest form is that shown in formula (*a*). The formula for the 7-segmented antennae is—7, (1, 2), 3, 4, 6, 5. The 4th joint is almost as long as the third and in some specimens these two segments are equal. *Mentum* dimerous, its length in mounted specimens approximately equalling the width of the base. *Body* with 17 pairs of cerarii, the numbers of spines in the cerarii varying considerably. These spines are approximately all equal in size except those of the anal pair and these are considerably larger. In the anal cerarii there is one spine or perhaps two of a dominant size in each group, the remaining spines being somewhat smaller. The following figures show the results of counts of the numbers of spines in the cerarii of 14 specimens.

Caudal Extremity ——————→ Cephalic Extremity.

Average—5, 5, 5, 4, 4, 4, 4, 4, 4, 6, 4, 6, 4, 5, 6, 5, 5
Maximum—7, 7, 6, 7, 6, 6, 7, 5, 7, 8, 6, 8, 6, 6, 8, 7, 7
Minimum—3, 3, 3, 3, 3, 2, 3, 2, 3, 0, 3, 4, 2, 4, 5, 3, 4

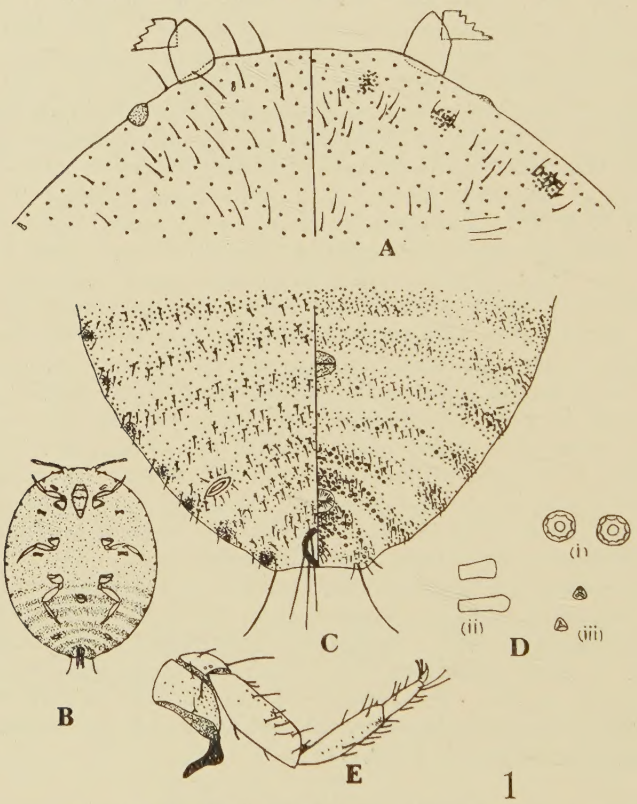


Fig. 1.—*Pseudococcus cocotis* Maskell. Adult ♀; *a*. Cephalic region; *b*. Outline of insect; *c*. Abdominal region; *d*. Pores on body, (i) large disc pores, (ii) tubular pores, (iii) triangular pores; *e*. Hind leg.

Each *cerarius* with several accessory hairs, these diminishing in number towards the middle of the body and increasing towards the anal end of the abdomen. Each anal cerarius with several accessory hairs, one or two of which are usually about $\frac{1}{3}$ of the length of each long anal lobe hair. Anal tubercles very small, each with one long hair which is approximately as long as the hairs of the anal ring. Anal ring with outer and inner pore-bands and with 6 hairs. In one of my specimens there are 7 anal-ring hairs. Triangular pores loosely clustered in each cerarius and these increase in number in the cerarii towards

the anal end of the body. Each anal cerarius with approximately 30–50 of these triangular pores. Cerarii with the least numbers of triangular pores towards the middle of the body. Numerous large disc *pores* on the ventral surface of the last 3 segments of the abdomen and also a few on the segment which is fourth from the anal extremity of the body. These pores are especially numerous on the last two segments of the abdomen and they are clustered for the most part round the genital aperture. There may also be a few pores of this type scattered singly farther up the body, particularly towards the edge near the cerarii.

Tubular ducts present. There are usually, though not always, one or two of these just dorsad of each cerarius except the anal pair and there are others scattered singly over the dorsal surface of the body. These ducts are present also on the ventral surface and are most numerous on the ventral area of each segment adjacent to each cerarius. The following figures show the numbers of these ducts ventrad to each cerarius on four typical specimens.

Caudal Extremity ——————→ Cephalic Extremity.

Average—3, 9, 8, 6, 5, 4, 3, 2, 1, 1, 1, 2, 2, 0, 0, 0, 1
Maximum—4, 14, 10, 8, 7, 5, 4, 3, 3, 1, 2, 5, 7, 1, 1, 0, 2
Minimum—0, 6, 5, 3, 3, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1

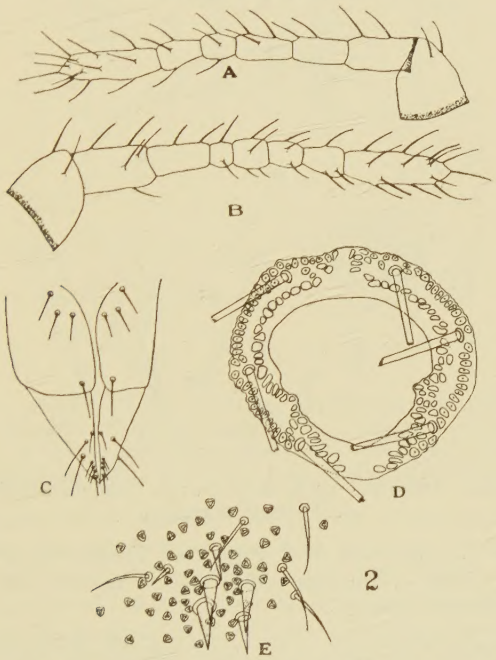


FIG. 2.—*P. cocotis.* Adult ♀; *a.* 7-segmented antenna; *b.* 8-segmented antenna; *c.* Mentum; *d.* Anal ring; *e.* Anal cerarius.

Tubular *ducts* are also present on the 2 ventral segments 3rd and 4th from anal end of the abdomen and are more or less in a row across each segment. These ducts vary in number, but there may be as many as 15–18 on each of the two segments and there may also be a few on the ventral surface of the last two segments of the body, but there do not appear to be any more of the tubular type on any part of the ventral surface other than those already described above. The small triangular *pores* are numerous on both surfaces, being thickest across the body segments. *Hairs* are fairly plentiful on the body, these being, on the abdomen towards the anal end, much stronger and longer on the dorsal

surface than on the ventral. On the rest of the body the hairs are generally smaller and the same in size on both surfaces, except on the head, where the hairs on the ventral surface are larger than those on the dorsal surface, these frontal hairs being larger than any others on the thorax. Generally the body hairs run across the segments and appear as tufts at the edges of the body. Some specimens are much more hairy than others, and there is also a considerable amount of variation in size of hairs between specimens. On the dorsal surface there are two caudal and two cephalic *cicatrices*, all with hairs present along the margins. There is also a conspicuous quadrate-circular median ventral cicatrix which appears to be very distinctly chitinised. The *tibiae* are rather short. The tarsal digitules are long fine hairs somewhat longer than the claw and they are slightly knobbed. The claw digitules are about the same length as the claw, thicker than the tarsal digitules and conspicuously knobbed. The trochanter is provided with one fairly long hair. The coxae of the hind legs show a number of minute translucent pores, these being more conspicuous in some cases than in others. These pores may also be present on the hind tibiae, especially towards the distal end, and some specimens show distinct pores on the hind femora.

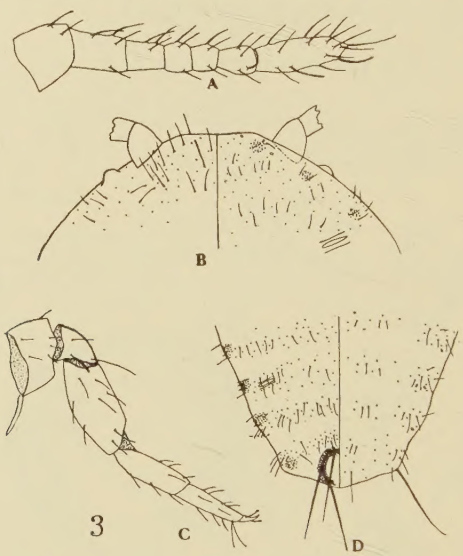


FIG. 3.—*P. cocotis*. Pre-adult ♀; *a*. Antenna; *b*. Cephalic region; *c*. Hind leg; *d*. Abdominal region.

(2) *Second Stage* ♀. Antennae of 7 segments. Formula—7 (1, 2, 3,) 6 (4, 5,) or 7 (1, 2,) (3, 6) (4, 5). *Mentum* dimerous. *Body* with 17 pairs of cerarii. In 5 specimens the cerarian spines were as follows :—

Caudal Extremity ——————→ Cephalic Extremity

Average—3, 3, 3, 3, 3, 3, 3, 3, 2, 3, 3, 3, 3, 3, 4, 4, 5
Maximum—4, 4, 4, 3, 4, 3, 4, 3, 4, 3, 3, 4, 4, 5, 6, 5, 7
Minimum—3, 2, 3, 2, 3, 3, 3, 2, 1, 2, 2, 3, 2, 2, 3, 3, 5

As in the adult, the spines in the anal cerarii are larger than those in the other cerarii. Small triangular pores loosely grouped in the cerarii and accessory hairs also present. *Anal ring* compound, with six hairs. The arrangement of the pores is somewhat different from that of the adult in that in the second-stage female the denticulation caused by the projection of a few of the cells of the inner ring occurs nearer the caudal end. There is a long hair on each anal lobe about the same length as the hairs of the anal ring. The small triangular pores are present all over the body and are most numerous in bands across the

segments. *Tubular ducts* present, these being apparently confined to the neighbourhood of the cerarii. There may be one or two of the large disc *pores* on the ventral surface. Body hairs and claw and tarsal digitules as in the adult—also with the long hair on the trochanter. *Cicatrices* as in adult except that the median ventral cicatrix does not show the conspicuous chitinisation.

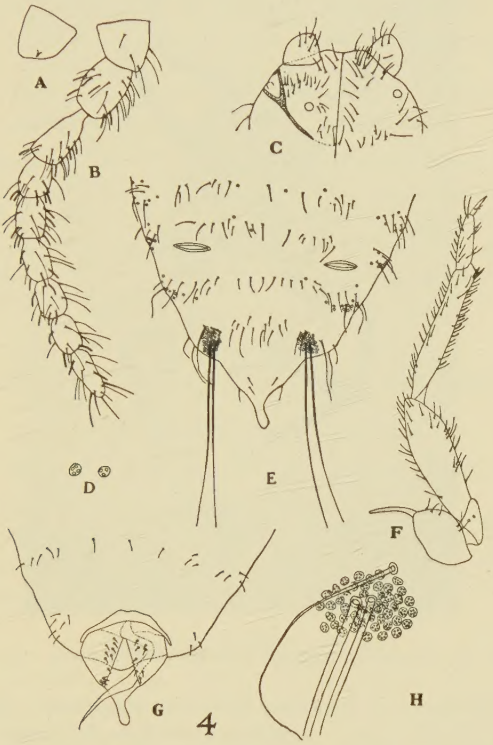


FIG. 4.—*P. cocotis.* Adult ♂; *a.* Showing projections on antennal segment 1; *b.* Antenna; *c.* Head; *d.* Pores typical of those on abdomen, except in the two groups on anal segment; *e.* Abdominal region (dorsal aspect); *f.* Hind leg; *g.* Ventral aspect of abdomen showing genitalia; *h.* Group of pores on dorsal surface of anal segment.

(3) *Larva.* Antennae with 6 segments. Formula—6 (1, 2, 3) (4, 5). Sometimes segments 1–5 are almost equal but always with 6 much larger. A few hairs present on each segment. *Mentum* dimerous. *Anal ring* compound with 6 hairs. *Cerarii* sometimes indistinct but usually there are 14 pairs, counting from the anal end of the abdomen, the rest being represented by groups of hairs. Cerarii each with 2 spines and a few of the triangular pores. Spines of the anal cerarii stouter than the others. There is one long hair on each anal lobe approximately as long as or a little longer than the anal ring hairs. Hairs present on both surfaces of the body, mostly in a row across each segment. The hairs on the dorsal surface are usually more numerous and stouter than those on the ventral surface, especially towards the anal end of the abdomen. The *triangular pores* are present on both surfaces, arranged for the most part in bands across the segments. These pores are more numerous on the dorsal surface than on the ventral. *Cicatrices* as in the second-stage female. The tarsal *digitules* are somewhat longer than the claw and are slightly knobbed. The claw digitules are about the same length as the claw and are conspicuously knobbed. They appear to be, however, of about the same thickness as are the tarsal digitules.

(4) *Adult* ♂. Colour yellowish both in dried specimens and specimens preserved in alcohol. Eyes very dark red, almost black. Specimens were enclosed in white cottony cocoons.

Fig. 5.—Photomicrograph of male of *P. cocotis*—× c. 40.

The following description is drawn up from two specimens. *Antennae* 9-segmented. Formula—3, 2, (1, 9,) (4, 5, 6, 7, 8,). Segments 1 and 2 are quite wide. Segment 3 is more or less club-shaped, being attached to segment 2 by a much narrower stalk-like piece. This segment is only slightly longer than 2. Segment 9 is slenderer than the others. Antennae provided with numerous hairs. On the ventral surface of segment 1 at the distal edge there is a short spine-like projection of the integument without any definite sock. *Eyes* are simple and are six in number, 3 on each side of the head. Two pairs are placed on the ventral surface and one on the dorsal. The median pair is the largest, the others being smaller and approximately equal in size. *Mouth-parts* absent except for what appears to be a rudimentary tube-like structure. *Body* entirely wingless. The *head* bears many hairs, which are stronger on the dorsal surface. Thorax and abdomen also with many hairs which occur more or less in bands across the segments, these hairs being considerably stronger on the dorsal surface. On the *abdomen*, at the edges of the body, in the positions normally occupied by the cerarii in the female, there are tufts of longer hairs. In each tuft there may be 2–6 of these hairs which becomes larger towards the caudal end of the abdomen. In each tuft there is a loose group of 2–11 circular pores, usually about 6, each pore with either 4 openings or 3. Where there are only 3 openings, the pore inclines to a triangular shape. On the anal segment, however, there are two groups each containing 40–50 closely packed circular pores each of which has usually 5 openings. From approximately the centre of each of these two anal groups there arises a pair of very long closely set hairs approximately $\frac{1}{5}$ of the length of the body. In each anal group there are also a few shorter hairs approximately $\frac{1}{3}$ of the length of the long ones. The hairs on the

edges of the thoracic segments also seem to be grouped into definite tufts, but they are not so well defined as on the abdomen. The circular pores are also scattered generally over the dorsal surface of the thorax and abdomen, there being only a few on the ventral surface. There may also be a few of these pores on the anterior of the head on the ventral surface. All these pores with 4 openings. The *legs* are hairy. The claw is rather long and slender. The tarsal digitules, as far as can be determined, are long fine hairs, about the length of the claw. The claw digitules are short fine hairs about $\frac{1}{3}$ of the length of the claw. On the distal end of the tibia on the ventral surface there are two conspicuous spines and associated with them there may be one or two smaller accessory spines. There are two dorsal caudal cicatrices without any adornment by hairs.

All the slides from which the above re-descriptions have been made are in the collection of the Plant Research Station, Palmerston North, New Zealand.

I wish to thank Dr. Miller of the Cawthron Institute, New Zealand, for the interest he has taken in the preparation of this paper; and also Mr. Brittin of Motueka, New Zealand, who at all times has been so generous to me whenever I have asked for his help and advice.

DESCRIPTIONS OF NEW SPECIES OF HISTERIDAE (COL.)

By Axel Reichardt.

Communicated by Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S., F.R.E.S.

Sir Guy A. K. Marshall, Director of the Imperial Institute of Entomology, has kindly sent me for determination some Histeridae from the tropical parts of Africa and Asia. Among this material I found representatives of some new species and one new genus, described below.

Asolenus perfidus sp. n.

Ovalis, modice convexus, niger, nitidus, antennis pedibusque castaneis. *Frons* convexa, glabra, lateribus fortiter, antice haud marginata, a clypeo non distincta. Antennae scapo vix tuberculato, funiculo versus clavam 4-articulatam tomentosamque vix dilatato. *Pronotum* longitudine sua duplo latius, basi subangulato-rotundatum, impressione praescutellari parva oblonga instructum, antrorsum arcuatim angustatum, stria marginali lateribus subtilissima, antice validiore integra, crenulata; disco laevi, ad marginem lateralem anguste haud dense punctato. *Elytra* limbo apicali, $\frac{1}{5}$ longitudinis elytrorum haud superante, dense substrigose punctato, impressione praeapicali nulla, striis dorsalibus 1–3 sat validis, impunctatis integris, 4a. dimidiata, antrorsum abbreviata, 5a. paullo breviore, suturalique ultra medium antrorsum producta subcrenatis, his tribus striis basi rudimentis haud auctis; stria humerali tenuissima, subhumerali interna fere $\frac{3}{4}$ longitudinis elytrorum occupante, externa subintegra, marginali lateribus manifesta, apice nulla, epipleuralibus duabus. *Propygidium* subbifoveolatum, sat fortiter, pygidium infexum multo debilius, apice minutissime, punctata. *Prosternum* lobo gulari punctato, lateribus fortius; apice fortiter marginato; postice truncatum, striis internis convergentibus et antice angulatim junctis, inde triangulum longum subtiliter punctatum includentibus, externis carinula angulosa substitutis. Foveolae antennales sub angulo antico pronoti dispositae, magnae, apertae. *Mesosternum* antice subrectum, vix sinuatum, striis marginalibus altera tenui integraque, altera (exteriore) late interrupta, linea late arciformi crenulata a metasterno separatum. *Tibiae* anticae in dimidio basali sensim dilatatae, in dimidio apicali parallelae, margine superiore 13–14 spinuloso; tibiae posteriores margine superiore in dimidio apicali 5–6 spinuloso. *Long. corporis*, capite pygidiisque exclusis, 3·0 mm., lat. 2·3 mm.

Habitat.—Africa Australis : Natal, Weenen, iii.1928 (*H. P. Thomasset*). Monotypus in coll. Mus. Britannici Londinio conservatur.

Quae species forma corporis *A. nodicorni* Lew., ceteris signis vero *A. duci* Lew., mihi in natura ignoto similis esse videtur, sed differt magnitudine minore, striis elytrorum 4-a–5-aque rudimentis basalibus spoliatis, subhumeralibus longioribus, etc.

Orphistes gen. n.

Corpus subquadrato-ovatum, convexum. *Frons* parum convexa, stria frontali subtili a clypeo separata. Labrum valde transversum. Antennae scapo normali, funiculo 7-articulato, versus clavam gradatim dilatato, hac tomentosa, solida. *Pronotum* minute punctulatum, margine laterali anguste elevato et stria marginali tenuissima instructo, striis lateralibus nullis. Elytra striis dorsalibus et subhumerali interna manifestis, simplicibus. Propygidium sat longum pygidiumque inflexum, punctata. *Prosternum* lobo gulari antice truncato, marginato, striis internis convergentibus, externis valde divergentibus, foveis antennalibus magnis, sub angulo antico pronoti dispositis et postice partim lamina inferiore prosterni obtectis. *Sternitum* abdominale primum postice ad apicem pygidii recipiendum arcuatim emarginatum. *Pedes* valde explanati, tibiis anticis latissimis, marginibus superiore inferioreque convexis, illo breviter spinuloso; sulco tarsali recto, deorsum cristula multisetifera, manifeste, sursum non laminato. Femora posteriora lata, facie anteriore praeter marginaturam marginis inferioris haud procul a margine superiore linea tenuissima longitudinali instructa, tibiis margine superiore brevispinoso, facie anteriore ante apicem cristula brevi obliqua multispinulosa instructis. Tarsi breves, unguiculis minutissimis.

Genus ob pedum structura peculiari a generibus ceteris Exosterninorum distinguendum, magis affinis esse videtur generi *Exostenus* Lew.

Typus et species unica : *Orphistes femoralis* sp.n.

Orphistes femoralis sp. n.

Niger, nitidus. Frons minute denseque punctulata, stria frontali antice subobsoleta. Pronotum minutissime punctulatum, angulis anticis acutis prominulis, nonnihil explanatis, margine laterali anguste et sat abrupte elevato, stria marginali lateribus tenuissima, ad angulos anticos duplicata (quod aegre discernendum est), antice pone caput valida, pone oculos utrinque subinterrupta; epipleuris haud pilosis. *Elytra* latitudine sua communi vix breviora, apice subrecte truncata, impressione praeapicali nulla, undique vix perspicue parceque puncticulata, striis dorsalibus 1–3 impunctatis, integris, reliquis multo debilioribus, 4a. et 5a. saltem dimidiatis, antrorsum evanescentibus, suturali vix longiore, stria humerali tenuissima, longa, subhumerali interna integerrima, subrecta, marginali et epipleurali integris, apicali nulla. *Propygidium* pygidiumque, minus fortiter, minute vadoseque punctata, illo in dimidio apicali impressione obsoleta longitudinali instructo (semperne ?) *Prosternum* striis internis et externis usque ad suturam transversam prosterni antrorsum productis, illis disjunctis, convergentibus; praeterea postice inter coxas utrinque stria accessoria tenuissima, mox abbreviata praeditum. Mesosternum in medio acute antrorsum productum, marginatum, stria marginali integra. *Tibiae* anticae oblongo-ovatae, latitudine sua vix duplo longiores, margine apicali sine angulo in marginem superiorem transeunte, hoc spinulis brevibus saltem 13, illo minutissimis 5 armatis. Tibiae posteriores latae, posticae fere subparallelae. *Long. corporis*, capite et pygidiis exclusis, 5·6 mm., long. totalis 6·8 mm., lat. 4·8 mm.

Habitat.—Africa orientalis : "Wamta, vii.21," Nairobi Museum. Monotypus in Museo Britannico, Londinio.

Diplostix volvulus sp. n.

Oblonga, subcylindrica, nigra, nitida. *Caput* desuper convexum, minute punctatum, stria frontali lateribus valida, oblique antrorsum directa, antice nulla, sutura clypeofrontali vix indicata. *Antennae* funiculo 6-articulato, articulis ejus 2o.–6o. aequilatis, transversis, capitulum magnum, subacuminatum, tomentosum. Palpi omnes articulo ultimo elongato-conico. *Pronotum* longitudine sua subduplo latius, antrorsum modice angustatum angulis anticis acutis, stria marginali pone oculos interrupta, lateribus postrorsum cum (?) margine divergente, superficie tota leniter subdense subaequaliterque, lateribus debilius punctata. Scutellum minutissimum. *Elytra* latitudine sua 1·1 longiora, saltem dimidio postico haud dense leniterque, antrorsum debilius, punctata; striis tenuibus, partim subundulatis, dorsalibus 1a.–3a. integris, 4a. basali brevissima, 5a. postrorsum ultra medium extensa, antice arcuatim cum stria suturali juncta, hac saltem bessem longitudinis elytrorum occupante, postice evanescente, nullo modo duplicata, stria subhumerali interna integra, marginali et epipleurali lateribus manifestis, apice immarginata. Basis elytrorum transversim subelevata; arculo basali striarum 5ae. suturalisque nec non rudimento striae 4ae. fortius

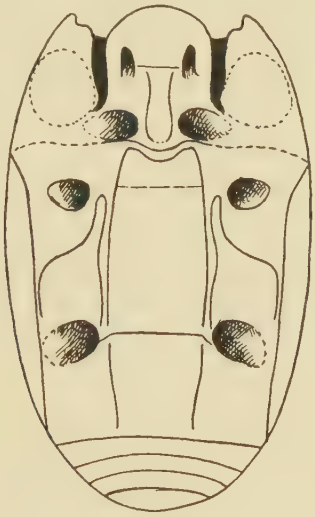


Fig. 1.—*Diplostix volvulus* sp. n., facies inferior (schema).

quam reliquae partes striarum impressis. *Propygidium* pygidiumque haud dense punctata. *Prosternum* striis internis subparallelis, basi obsoletissime junctis, antrorsum ad suturam transversam, quae lobum gularem limitat, terminata, hoc leniter punctulato, subtiliter marginato, lateribus basi profundo impresso. Mesosternum et metasternum vix punctulata, nitida, sutura meso-metasternali obsoletissima; illo antico profunde semicirculariter emarginato, stria marginali integra, valida, retrorsum utrinquo usque ad basin metasterni continuata, ibique striae alteri lateris fere parallela et per totam metasterni lingitudinem duplicata (fig. 1); praeterea utrinque a margine interiore acetabuli coxae intermediae stria tertia, valde S-formiter sinuata, postice margini laterali metasterni parallela eique proxima, fere usque ad metepimera sese extendit, antice cum stria longitudinali externa metasterni juncta. *Tibiae* anticae valde dilatatae, forma ut in speciebus vicinis, margine superiore 4-denticulato. Long. corporis, capite et pygidiis exclusis, 1·1 mm., lat. 0·65 mm.

Habitat.—Africa or: Uganda, Nakasaja, 20.i.1924 (*H. Hargreaves*). Monotypus in Museo Britannico.

Niponius polinae sp. n.

Cylindricus, niger; capite, elytris, antennis pedibusque obscure castaneis. Caput latitudine sua 1·25 longius, antice angulatim excisum, processibus anterioribus anguliformibus, non attenuatis, apice carinulis transversis parum evolutis duabus; sulco mediano retrorsum angustato, fere bessem longitudinis capitis attingente, supra minute subdense punctatum (punctura inaequali, partim duplici); temporibus diametrum majorem oculi fere duplo superantibus, verticeque vix punctatis. Antennae funiculo 6-articulato, clava subrotundata, compressa, dimidio apicali tomentosa. Mandibulae validae, tridentatae. *Pronotum* parallelum, antice truncatum, superficie irregulariter inaequaliterque, latera versus obsolete punctata, antice ad finem trientis anterioris utrinque impressione obsoleta crebrius punctata praeditum; sulco mediano nullo. *Elytra* parallela, latitudine sua 1·5 longiora, basi toruloso-marginata, minutissime obsoletèque punctulata; striis dorsalibus 1a. subnulla, 2a.–6a. gradatim fortioribus, antice punctatis, postice ad bessem longitudinis elytrorum evanescentibus; stria marginali integra, apicali nulla. Propygidium breve, sat dense minuteque, antice obsolete punctatum, foveolis nullis. Pygidium basi duabus foveolis permagnis subreniformibus, majorem partem pygidii occupantibus marginesque basalem et lateralem attingentibus, extrorsum profundius impressis et magis ardue limitatis, spatio longitudinali mediano, latitudine duplo minori quam utraque foveola separatis, hoc spatio, itemque parte apicali pygidii dense minuteque punctatis. *Prosternum* inter coxas subplanum, striis prosternalibus subparallelis, antrorsum vix divergentibus et debilioribus, antice posticeque disjunctis. Meso-et metasternum sulco mediano, postice vix abbreviato, praedita. *Tibiae* anticae et posticae apicem versus bidenticulatae, intermediae tridenticulatae. *Long.* 8·0 mm., lat. 1·8 mm.

Habitat.—Malacca mer.: Pahang, Camerons Highland, Tanah Rasa, 4800′, 20.i.1920 (*M. R. Henderson*). Monotypus in coll. Musei Britannici.

N. polinae Reichardt ex omnibus congeneribus maximus, propygidio haud foveato solummodo *N. optusicipiti* Lew. e Japonia accedere videtur.

NOTES ON CORIXIDAE (HEM.) *

By Dr. T. Jaczewski.

(*Polish Museum of Zoology, Warsaw.*)

Communicated by Dr. S. A. Neave, O.B.E., F.R.E.S.

XII. Re-description of *Sigara substriata* (Uhler).

Corisa substriata Uhler, 1897, *Proc. U.S. Nat. Mus.*, **19** (1108) : 275.

Owing to the kindness of the late Dr. J. M. Aldrich I received for examination from the collection of the U.S. National Museum, Washington, 2 ♂♂, paratypes of this species, of the original series on which P. R. Uhler based his description; I am able thus to complete it with the following details.

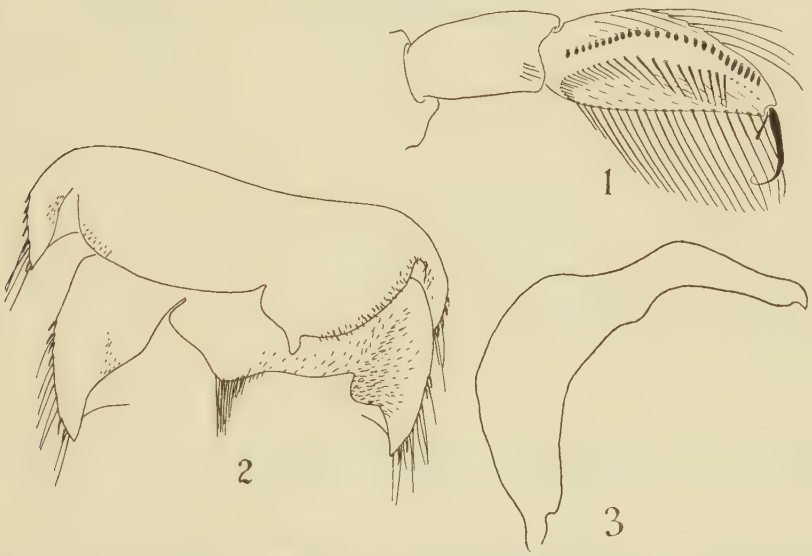
Frontal arch feebly prominent. Face almost glabrous. Facial impression of male distinct but small, with rounded margins, reversed oval in shape, extending above only a little over the level of the inferior eye angles and not touching them. Pronotal disk about $1\frac{2}{3}$ times as wide as long, crossed by 7–8 pale transverse lines, slightly narrower than the dark intervals of the ground-colour between them. Pronotal keel visible only in front. Lateral angles obtusely rounded. Posterior angle moderately developed. Lateral lobes of the prothorax narrowing gradually towards the rounded apex. Pronotal disk with fairly

* Cf. 1931, *Ann. Mus. zool. Polon.*, **9** : 147–154, pl. xiii.

distinct rastration, base of clavus very feebly rastrated, the rest of the hemelytra almost smooth. The pale pattern of the hemelytra not dominating the dark ground-colour; its disposition more or less as described by Uhler (*loc. cit.*). Membranal suture well marked by a pale oblique line. *Underside*, in the specimens which I was able to examine, entirely pale. Metasternal xiphus very short, blunt at the apex, with almost straight margins. Front legs of the ♂. Trochanter uniformly pubescent. Femur with a small area of thickened hairs on the inner side of its basal part. Tibia offering no peculiar features. Pala (fig. 1) comparatively small, semi-oval in shape, with a single, arched row of stridulatory pegs, 26 in number, growing longer and more pointed towards the apical portion of the row. Outer palar bristles about 10, the inner ones more than 20 in number. Relative length of the various parts of the intermediate and hind legs, measured in percentages of the length of the corresponding femora, as follows :—

	Femur.	Tibia.	Tarsus.	Claws.
Intermediate legs . .	100	44·4	30·6	43·5
	Femur.	Tibia.	Tarsus 1.	Tarsus 2.
Hind legs	100	93·3	106·7	51·7

Intermediate claws much longer than the tarsi, nearly as long as the tibiae. Upperside of hind femora with a small group of 4 short spines; underside with a few scattered spines. Hind tarsi completely pale, without any traces of dark coloration. Strigil absent. Right



Figs. 1–3.—*Sigara substriata* (Uhler), ♂. 1. Front tibia and pala. × 60; 2. 6th and 7th abdominal tergites. × 27; 3. Right side paramere. × 60.

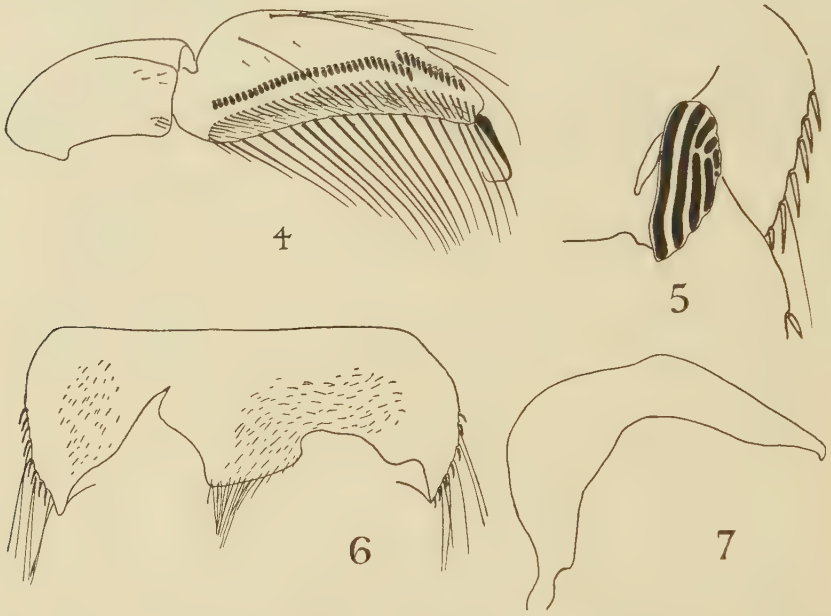
side of the sixth abdominal tergite of the male with a tongue-like process at its posterior margin, directed backwards; central lobe of seventh tergite with a large tuft of long bristles (fig. 2). Right side paramere as shown on fig. 3, with a small claw-like tooth at the apex. Left side paramere comparatively wide, blunt at the end. Posterior process of ninth abdominal segment with several transverse striae in its terminal part. Phallosoma relatively thick, with two membraneous outgrowths at the end.

Length 5·75–6 mm.

The specimens were taken in Japan, but no indication as to the exact locality could be obtained.

S. substriata (Uhler) is probably allied with several other east-Asiatic species of the genus, characterised by the absence of the strigil, such as: *S. japonica* (Lundbl.),* *S. chinensis* (Lundbl.)† and *S. bellula* (Horv.).‡ It differs from them, however, by the shape of the right paramere, as well as by many other characters peculiar to the male sex. I do not consider it justifiable to place all these species in the genus *Callicorixa* B.W., since the males do not possess a strigil. Personally I am inclined to give *Callicorixa* B.W. at most subgeneric rank and reserve it for the species of the so-called *praeusta*-group, i.e. *Sigara praeusta* (Fieb.) and its nearest allies.

It is impossible to say, without an examination of the types, whether *S. substriata* (Uhler) is identical with any of the Japanese species of Corixidae described subsequently by Prof. Matsumura. The data concerning the occurrence of this species in India and Ceylon § are based most probably upon errors of identification.



Figs. 4–7.—*Sigara marginata* (Fieber), ♂. 4. Front tibia and pala. × 60; 5. Strigil. × 60; 6. 7th abdominal tergite. × 27; 7. Right side paramere. × 60.

XIII. The male of *Sigara marginata* (Fieber).

Corisa marginata Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5) **7**. *Sp. Gen. Corisa* (sep.: 17–18), pl. i, fig. 8.
Sigara marginata Lundblad, 1929, *Arch. Hydrobiol.*, **20** : 311, pl. xi, fig. 5.

Fieber's description of this species was based apparently upon a single ♀, taken at the Sinai Peninsula, some hundred years ago. This specimen, which is still in the collection of the Zoologisches Museum at Berlin, was re-examined some years ago by Dr. O. Lundblad. In a small collection of aquatic Hetero-

* *Callicorixa japonica* Lundblad, 1928, *Ent. Tidskr.*, **48** : 219–222, figs. 1–4, pl. iv, fig. 2.
† *Callicorixa chinensis* Lundblad, 1929, *Ent. Meddel.*, **16** : 283–287, figs. 6–9, pl. ii.
‡ *Corisa bellula* Horváth = *Callicorixa bellula* Lundblad, 1933, *Ent. Tidskr.*, **54** : 261–263, fig. 6, pl. 13, fig. 2.
§ Distant, 1910, *Fauna Brit. India, Rhynchota*, **5** : 340–341.

ptera from Arabia, received for study from the Zoological Institute of the Academy of Sciences of Leningrad, by the kindness of Mr. A. N. Kiritshenko, I was glad to discover a ♂ beyond any doubt conspecific with the almost forgotten *Sigara marginata* (Fieber). It agrees completely both with Fieber's original description and with the supplementary notes published by Dr. Lundblad, as also in particular, in the pattern of the hemelytra, with the photograph accompanying his brief re-description of the type. I am able thus to give a supplementary account of the structural details of *S. marginata* (Fieb.), especially of the systematically important characters shown by the ♂.

Ground-colour of pronotal disk and of hemelytra dark brown; head, underside and legs yellow; thoracic sterna, coxae and venter of abdomen more or less darkened. Frontal arch moderately prominent. Facial impression of male large, arched above, extending considerably upwards between the eyes and almost touching their inner angles. Rastration and pattern of pronotal disk and of hemelytra as described and figured by Lundblad (*loc. cit.*). The pale pattern distinctly more strongly developed than the dark intervals of the ground-colour. Lateral angles of pronotal disk obtuse. Lateral lobes of the prothorax tongue-like, rather wide at the base, rounded at the apex. Metasternal xiphus short, triangular, with slightly concave margins. Front legs of the ♂. Trochanter uniformly pubescent. Femur showing no area of thickened hairs on the basal part of its anterior side. Tibia three-edged towards the apex. Pala (fig. 4) elongated, widest in its basal portion, then narrowing gradually towards the apex. Two rows of stridulatory pegs : a long proximal one, more or less parallel to the inner palar margin, and a much shorter distal one in the terminal one-third of the pala; the apical end of the proximal row and the beginning of the distal one very close to each other. The terminal pegs of the proximal row, as well as those standing in the distal row, a little more elongated than the basal ones. The number of pegs is 32 in the proximal row and 11 in the distal one. Inner palar bristles about 20, the outer ones about 10 in number. Intermediate claws as long as the tarsi. These darkened at the extreme tip. Upperside of hind femora with a somewhat irregular row of about 7 short spines; underside with 4 isolated spines. Hind tarsi pale. Strigil (fig. 5) moderately developed, elongated, with five partly interrupted combs. Central lobe of seventh abdominal tergite (fig. 6) wide, almost obliquely truncate, with a tuft of long bristles. Right side paramere as shown on fig. 7. That on the left side tapering towards the apex which is somewhat produced. Posterior process of ninth abdominal segment and phallosoma offering no remarkable characters.

Length of ♂, 6·25 mm.

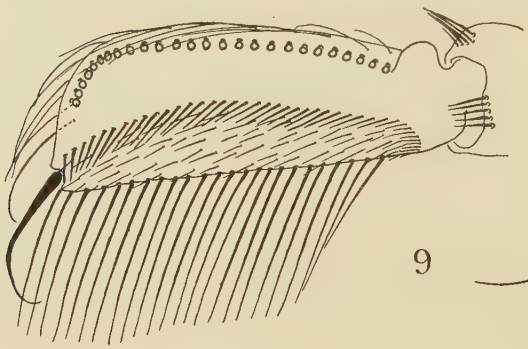
Yemen : Sanaa, 24.xi.1931 (*Zhenzhurist*), 1 ♂ Zool. Inst., Acad. Sci., Leningrad, together with several specimens of *Corixa affinis* Leach and *Sigara hieroglyphica* (Duf.).

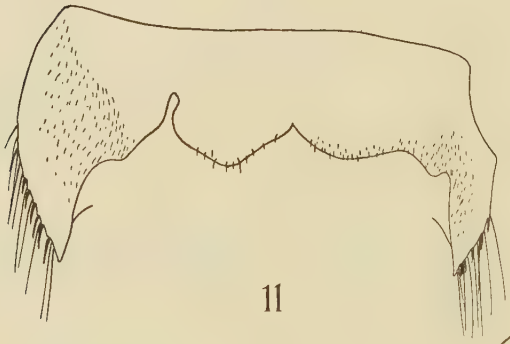
It is impossible at present to say anything definite as to the systematic position of this species or its affinity with other species of the genus.

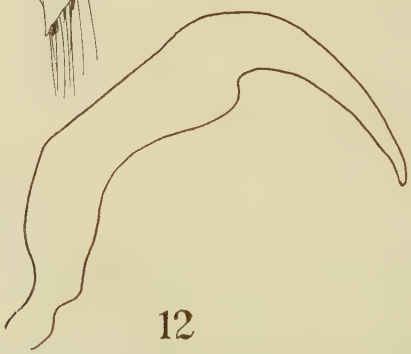
XIV. Description of a new species of *Sigara* (*Anticorixa*) with notes on the subgenus.

Sigara (Anticorixa) ussuriensis sp. n.

Ground-colour of pronotal disk and of hemelytra dark brown; head, underside and legs pale yellow; thoracic sterna and ventral side of abdomen more or less infuscated, especially so in the males. Head, when seen from above, a little less than half as long as the pronotal disk. Frontal arch distinctly more prominent in the males than in the females. Facial impression of males distinct and large, although moderately deep, extending upwards considerably between the eyes, rounded above, not touching, however, the inner eye angles.







Figs. 8–12.—*Sigara* (*Anticorixa*) *ussuriensis* sp. n., ♂. 8. Hemelytron. × 10; 9. Pala. × 60; 10. Strigil. × 60; 11. 7th abdominal tergite. × 27; 12. Right side paramere. × 60.

Face almost glabrous in both sexes. Fourth antennal joint equal in length to 69·2 per cent. of the third. Pronotal disk a little less than 1½ times as wide as long, crossed by 7–9 partly furcated pale transverse lines, which are slightly narrower than the dark intervals between them. Lateral angles rounded. Lateral lobes of the prothorax trapezoidal, as in other species of the subgenus. Pronotal disk, clavus and corium distinctly and fairly strongly rastrated; the rastration becomes less apparent towards the apex of the corium; membrane smooth, shining. Pubescence of hemelytra moderately developed, consisting of thin, pale hairs. The pale pattern of the hemelytra (fig. 8) resembling that of *S.* (*A.*) *mandshurica* (Jacz.),* the pale transverse lines being, however, somewhat more regular and less interrupted; they are about twice narrower than the dark intervals of the ground-colour between them, except at the base of the clavus where several lines are distinctly widened interiorly. Membranal suture marked by a partly interrupted oblique pale stripe. Marginal area pale, its outer border infuscated. Metasternal xiphus elongated, arrow-like, with slightly concave margins. Front legs of the ♂. Trochanter uniformly pubescent. Femur with simple, not thickened hairs on the basal part of its anterior surface. Tibia three-edged towards the apex, with a distinct subapical spiniform bundle of stiff hairs exteriorly. Pala (fig. 9) of a shape typical for the species of the subgenus *Anticorixa* Jacz. Inner margin with over 20, the outer one with about 15 bristles. The number of stridulatory pegs was found to be, on 2 palae examined, 26, 26. Relative length of the various parts of the intermediate and hind legs, expressed in percentages of the length of the corresponding femora, as follows :—

	Femur.	Tibia.	Tarsus.	Claws.
Intermediate legs . .	100	40	31·6	34·7
	Femur.	Tibia.	Tarsus 1.	Tarsus 2.
Hind legs	100	100	115·7	49·5

Intermediate claws a little longer than the tarsi. Upperside of hind femora with over 60 small spines of various size, scattered almost along the whole inner portion of this side of the femur. The glabrous part of the underside bearing over 40 similar spines. Strigil (fig. 10) elongated, with 6 regular combs. Central lobe of seventh abdominal tergite of the male (fig. 11) rather feebly developed, showing no tuft of long bristles; the right side margin of the seventh segment with an angular prominence. Right side paramere (fig. 12) irregularly falciform, with a rounded dilatation at the inner side before the beginning of its terminal, tapering portion. Left side paramere wide in its basal part, narrowing gradually towards the apex, with numerous small spines, resembling in general that of *S.* (*A.*) *kolthoffi* Lundbl.† Posterior processus of ninth abdominal segment twisted in its terminal part. Phallosoma harpoon-like at the end.

Length 9·25–9·5 mm.

Ussuri Region : district of Spassk, Yakovlevka (*Dyakonov* and *Filipjev*), 6.viii.1926, 1 ♂, 30.viii.1926, 2 ♂♂, 31.viii.1926, 3 ♂♂, 2 ♀♀, Zool. Inst., Acad. Sci., Leningrad. One of the males has been selected as holotype.

This species differs from *S.* (*A.*) *mandshurica* (Jacz.) and from *S.* (*A.*) *kolthoffi* Lundbl. by the shape of the right side paramere in the males, by its smaller size, by the lower number of stridulatory pegs on the palae of the males, as well as by the more regular pale transverse lines on the hemelytra.

I established the subgenus *Anticorixa* in 1924 ‡ for the European species *S.* (*A.*) *sahlbergi* (Fieb.), *linnei* (Fieb.), *moesta* (Fieb.) and *castanea* (Thoms.). Since that time a considerable number of additional species have been discovered

* 1924, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : pl. v, fig. 2.
† 1933, *Ent. Tidskr.*, **54** : 259, fig. 5 *h*.
‡ 1924, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : 83–84.

or re-examined and re-described, and these show a remarkable affinity with *S.* (*A.*) *sahlbergi* and its allies and should be placed in this subgenus. The original diagnosis of the subgenus *Anticorixa* Jacz. has consequently to undergo a certain alteration, as not all characters on which it was based prove to be of equal importance.

The species of the subgenus *Anticorixa*, as at present known, have the following structural details in common.

Lateral lobes of the prothorax trapezoidal, obliquely truncated at the apex; rastration of pronotal disk and of hemelytra distinct, often strong; pala of ♂♂ subparallel-sided, with a distinct tubercle-like prominence at the base of its outer margin, apex of pala blunt, rounded or truncated, the outer margin meeting with the inner one more or less at right angles at the insertion point of the claw; one row of stridulatory pegs repeating more or less the curvature of the outer palar margin (in some species there may be isolated pegs standing outside the row in the terminal part of the pala); front tibiae of ♂♂ almost always with a subapical, outer spiniform bundle of stiff hairs; front femora of ♂♂ with the hairs on the basal part of their anterior side only feebly thickened, if at all; strigil relatively large, oblong elliptical. In the shape of the lateral lobes of the prothorax, in the structure of the front legs of the ♂♂, and in the shape of the strigil the species of *Anticorixa* show a remarkable resemblance with those of the sinistral genus *Corixa* Geoffr.

According to our present knowledge the following species belong to the subgenus *Anticorixa* * :—

Sigara (*Anticorixa*) *sahlbergi* (Fieber), 1848.

Corisa sahlbergi Fieber, 1848, *Bull. Soc. Nat., Moscou*, **21** : 519, pl. x, figs. 9–10.
C. sahlbergi Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5) **7**. *Sp. Gen. Corisa* (sep. : 25), pl. ii, fig. 3.
Callicorixa (*Anticorixa*) *sahlbergi* Jaczewski, 1924, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : 76–79, figs. 83–87, pl. iii, fig. 14.

Type of subgenus (by original designation).
Greater part of Europe; Algeria; Caucasus.

S. (*A.*) *parallela* (Fieber), 1861.

Corisa parallela Fieber, 1861, *Europ. Hemipt.*, 96.
Sigara (*Anticorixa*) *parallela* Jaczewski, 1929, *Ann. Mus. Hung.*, **26** : 30–32, figs. 15–19.

Europe : S.E. Poland, E. Czechoslovakia, Hungary, Rumania, Greece, Crimea; Caucasus.

S. (*A.*) *occulta* Lundblad, 1929.

Sigara occulta Lundblad, 1929, *Ent. Meddel.*, **16** : 300–305, figs. 24–28, pl. iv.

Afghanistan, Buchara.

S. (*A.*) *linnaei* (Fieber), 1848.

Corisa linnaei Fieber, 1848, *Bull. Soc. Nat., Moscou*, **21** (1) : 519–520.
C. linnaei Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5), **7**. *Sp. Gen. Corisa*, (sep. : 25–26), pl. ii, fig. 4.
Callicorixa (*Anticorixa*) *linnei* Jaczewski, 1924, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : 79–81, figs. 3, 4, 25, 26, 88–92, pl. iii, fig. 15.

Greater part of Europe; Morocco; Algeria; Caucasus; Asia Minor; Syria; Siberia.

* Only references to the original descriptions, re-descriptions and important synonyms are given.

S. (*A.*) *castanea* (Thomson), 1869.

Corisa castanea Thomson, 1869, *Opusc. Ent.*, **1** : 30.
Sigara (*Anticorixa*) *castanea* Jaczewski, 1928, *Ann. Mus. Hung.*, **25** : 204–206, figs. 1, 3–5.
S. castanea China, 1933, *Ent. Mon. Mag.*, **79** : 154–156, fig. 1 *b*.

EUROPE : Portugal, France, Holland, England, Scotland, Germany, Poland, Sweden.

S. (*A.*) *moesta* (Fieber), 1848.

Corisa moesta Fieber, 1848, *Bull. Soc. Nat. Moscou*, **21** : 527.
C. moesta Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5) **7**. *Sp. Gen. Corisa* (sep. : 34), pl. ii, fig. 17.
Callicorixa (*Anticorixa*) *moesta* Jaczewski, 1924, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : 81–83, figs. 93–95, pl. iii, fig. 16.
S. (*A.*) *moesta* Jaczewski, 1928, *Ann. Mus. Hung.*, **25** : 205–206, figs. 2, 6.
S. moesta China, 1933, *Ent. Mon. Mag.*, **79** : 154–156, fig. 1 *a*.

EUROPE : Portugal, Spain, France, Belgium, Holland, England, Scotland, Ireland, Germany, Sweden, Poland, Czechoslovakia, Switzerland, Austria, Hungary, Italy, Ukraine; ALGERIA; TUNIS.

S. (*A.*) *furtiva* (Horváth), 1907.

Corixa furtiva Horváth, 1907, *Ann. Mus. Hung.*, **5** : 318.
Arctocorisa royeri Poisson, 1927, *Bull. Soc. zool. Fr.*, **52** : 37–43, figs. 1–4.
Sigara furtiva Lundblad, 1928, *Ent. Tidskr.*, **48** : 240–241.

EUROPE : S. France; ALGERIA.

S. (*A.*) *monticellii* (Caroli), 1924.

Corixa monticellii Caroli, 1924, *Monit. zool. Ital.*, **35** : 197–200.
Corisa monticellii Caroli, 1928, *Ann. Mus. zool., Napoli*, (*n.s.*) *Suppl., Fauna degli Astroni*, **12** : 6–8, pl. 12, figs. 1–15.

ITALY.
Possibly a synonym of the preceding species.

S. (*A.*) *algirica* (Puton), 1890.

Corixa algirica Puton, 1890, *Rev. d'Ent., Caen*, **9** : 230.
Sigara algirica Poisson, 1935, *Arch. Zool. exp. gén.*, **77** : 515–517, figs. xxxix–xli.

EUROPE : S. France, Spain; ALGERIA.

S. (*A.*) *mandshurica* (Jaczewski), 1924.

Callicorixa (*A.*) *mandshurica* Jaczewski, 1934, *Ann. zool. Mus. Polon. Hist. nat.*, **3** : 151–154, pl. v.

MANCHURIA.

S. (*A.*) *kolthoffi* Lundblad, 1933.

S. (*A.*) *kolthoffi* Lundblad, 1933, *Ent. Tidskr.*, **54** : 257–261, figs. 4*c*–5, pl. 13, fig. 1.

CHINA : Kiangsu.

S. (*A.*) *ussuriensis* sp. n.

USSURI REGION.

S. (*A.*) *interrupta* (Say), 1825.

Corixa interrupta Say, 1825, *J. Acad. nat. Sci. Philad.*, **4** : 328.
Corisa interrupta Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5) **7**. *Sp. Gen. Corisa* (sep. : 27), pl. ii, fig. 7.
Arctocorisa interrupta Abbott, 1923, *Bull. geol. nat. Hist. Surv. Hartford, Conn.*, **34** : 387–389, figs. 1, 5.
Sigara interrupta Lundblad, 1929, *Ent. Tidskr.*, **50** : 27–29, figs. 6–7, pl. iii, fig. 3.

United States : from the Atlantic coast to California, New Mexico and Colorado; Mexico.

S. (*A.*) *vulgaris* (Hungerford), 1925.

Arctocorixa vulgaris Hungerford, 1925, *Bull. Brooklyn ent. Soc.*, **20** : 143–144, pl. vi, figs. 1–2.
S. (*A.*) *vulgaris* Jaczewski, 1931, *Arch. Hydrobiol.*, **23** : 514–516, figs. 17–19.

United States : New York, Massachusetts, Michigan, Minnesota, Ohio, Kansas, S. Dakota, Washington; Canada : Quebec, Ontario.

S. (*A.*) *lobata* (Hungerford), 1925.

Arctocorixa lobata Hungerford, 1925, *Bull. Brooklyn ent. Soc.*, **20** : 143, pl. vi, figs. 5–6.

United States : New York, Minnesota.

S. (*A.*) *obliqua* (Hungerford), 1925.

Arctocorixa obliqua Hungerford, 1925, *Bull. Brooklyn. ent. Soc.*, **20** : 142–143, pl. vi, figs. 3–4.

United States : New York, New Jersey, Indiana, Minnesota, Iowa, Illinois, Missouri, Kansas, Oklahoma, Texas.

S. (*A.*) *martini* (Hungerford), 1928.

Arctocorixa martini Hungerford, 1928, *Ent. News, Philad.*, **39** : 157.

United States : Georgia.

S. (*A.*) *laevigata* (Uhler), 1893.

Corisa laevigata Uhler, 1893, *Proc. ent. Soc. Wash.*, **2** : 384–385.

United States : New Jersey, Maryland, Rhode Island, Utah, New Mexico, Nevada, Washington, Oregon, California.

S. (*A.*) *kennicottii* (Uhler), 1897.

Corixa kennicottii Uhler, 1897, *Trans. Md. Acad. Sci., Baltimore*, **1** : 393.
Arctocorisa kennicottii Abbott, 1923, *Bull. geol. nat. Hist. Surv. Hartford, Conn.*, **34** : 387–389, figs. 2, 7.
Arctocorixa kennecottii Hungerford, 1928, *Ann. ent. Soc. Amer.*, **21** : 140–141, pl. viii, figs. 2, 4, 6.

United States : Atlantic States, Illinois; Canada : Quebec, Ontario.

S. (*A.*) *nitida* (Fieber), 1851.

Corisa nitida Fieber, 1851, *Abh. k. böhm. Ges. Wiss. Prag.* (5) **7**. *Sp. Gen. Corisa*, (sep. : 28), pl. ii, fig. 8.
Arctocorisa nitida Abbott, 1923, *Bull. geol. nat. Hist. Surv. Hartford, Conn.*, **34** : 387–389, fig. 6.
Sigara nitida Lundblad, 1929, *Arch. Hydrobiol.*, **20** : 300–303, figs. 4–8, pl. x, fig. 1.

United States : Connecticut, New York, Maryland, N. Carolina, Georgia, Indiana.

S. (*A.*) *lucida* (Abbott), 1916.

Arctocorisa lucida Abbott, 1916, *Ent. News, Philad.*, **27** : 341.
A. lucida Abbott, 1923, *Bull. geol. nat. Hist. Surv. Hartford, Conn.*, **34** : 387–389, figs. 3, 9.
Arctocorixa lucida Hungerford, 1928, *Ann. ent. Soc. Amer.*, **21** : 140–141, pl. viii, figs. 7–8.

United States : Massachusetts, Rhode Island, Connecticut, N. Carolina, Georgia; Canada : Ontario.

S. (*A.*) *michiganensis* (Hungerford), 1926.

Arctocorixa michiganensis Hungerford, 1926, *Bull. Brooklyn ent. Soc.*, **21** : 197–198, pl. xiii, fig. 15.

United States : Michigan; Canada : Quebec.

S. (*A.*) *minorella* (Hungerford), 1926.

Arctocorixa minorella Hungerford, 1926, *Bull. Brooklyn ent. Soc.*, **21** : 197, pl. xiii, figs. 10, 12.

United States : Michigan; Canada : Quebec.

S. (*A.*) *atopodonta* (Hungerford), 1927.

Arctocorisa dubia Abbott (nom. praeoc.), 1916, *Ent. News, Philad.*, **27** : 342.
Arctocorixa atopodonta Hungerford, 1927, *Bull. Brooklyn ent. Soc.*, **22** : 35.
Sigara atopodonta Lundblad, 1929, *Ent. Tidskr.*, **50** : 29–33, figs. 8–9, pl. iii, fig. 4.

United States : Maine, Massachusetts ; Canada : Quebec, Ontario.

S. (*A.*) *semilucida* (Walley), 1930.

Arctocorixa semilucida Walley, 1930, *Canad. Ent.*, **62** : 284–285, pl. 21, fig. 3 *a–d*.

Canada : Ontario.

It is possible, of course, that some other species, insufficiently described by earlier authors, and not re-examined so far according to modern methods, will prove to be members of the subgenus *Anticorixa* Jacz also.

As may be seen, the subgenus *Anticorixa* is typically holarctic in its distribution, and resembles in this respect the genus *Corixa* Geoffr., the species of which occur only in the Palaearctic Region and in some neighbouring countries (Abyssinia, East Africa, India). From Central Europe, where the fauna of aquatic Hemiptera has been thoroughly studied, we know 4–5 species of *Anticorixa*. In North America the subgenus is represented, according to our present knowledge by not less than 13 species, and this number may be increased by new discoveries. From the Far East (Eastern Siberia, Manchuria, China) 3 species have been described so far, although investigations of the fauna of aquatic Hemiptera of those regions have scarcely begun as yet. It seems thus justifiable to assume that the subgenus *Anticorixa* is most richly represented in the Nearctic Region and perhaps also in North Eastern Asia, reaching only with comparatively few species as far westwards as Europe.

AFRICAN BEES OF THE GENUS *CROCISA* (HYM.)

By Prof. T. D. A. Cockerell, F.R.E.S.

When writing recently on the African parasitic bees of the genus *Coelioxys*, I had occasion to remark on the very wide distribution of several of the species. The same thing may be observed in the parasitic genus *Crocisa*, as shown by the records below. Some species seem to be uninfluenced by differences in environment, which have resulted in the development of extremely different faunae, taken as a whole. Why this should be, is at present not clearly evident.

The species listed below (including the holotypes of the new ones) will be found in the British Museum.

Crocisa albociliata (Meyer) Alfken.

Algeria: Biskra, May 17, 1913 (*J. Bequaert*). From the Salt collection, now in the British Museum. The sexes differ in the hair on mesothorax; in the female the longitudinal band and discal spots stand out clearly against a black background.

Crocisa arcuata Vachal.

S.W. Africa: Otavifontein, Dec. 30 (*L. Ogilvie, J. Ogilvie*); Omaruru, Jan. 15 (*L.O., J.O.*).

S. Rhodesia: Shangani, De Beers Ranch, May (*J. Ogilvie*).

Natal: Weenen, Jan. (*Thomasset*). Variety with small spots on axillae.

Crocisa ashabadensis Radoszkowski.

Sudan: Erkowit, June 10, 1917 (*H. H. King*). One male, about 9·5 mm. long; tegument of abdomen submetallic; all pubescent markings pure white. Distinguished from *C. ramosa* Lep. by the finely punctured and striate lateral lobes of scutellum. Distinguished from *C. erythraaensis* Meyer by the shape of the scutellum, and the total lack of a white spot above the incision.

Crocisa bouyssoui Vachal.

Belgian Congo: Coquilhatville, April 7, 1924 (*J. Bequaert*); Sankuru, Komi, Feb. 18, 1930 (*Ghesquière*). The last in the Congo Museum.

Crocisa braunsiana Friese.

S.W. Africa: Swakopmund (on the coast), Feb. 6, 1934 (*J. Ogilvie*); Aus. Dec. 1929 (*R. E. Turner*); Omaruru, Jan. 15, 1934 (*L. Ogilvie*).

Crocisa braunsiana polysticta Cockerell & Mackie.

Natal: Greytown, Oct. 20, two (*W. P. Cockerell*).

N. Rhodesia: Sinapunga, Feb. 13, 1911 (*Silverlock*).

Cape Province: Matjesfontein, Dec. 1928 (*R. E. Turner*).

S.W. Africa: Hoffnung, Oct. 24–26, 1933 (*K. Jordan*). Four, one of which is somewhat transitional to typical *C. braunsiana*. In all, the triangular spot on hind part of mesothorax is separated from the lateral band.

S. Rhodesia: Christmas Pass, Umtali, May (*J. Ogilvie*). Small, with metallic abdomen, and discal spots on scutellum small.

Uganda: Turkana Plains, near Nepal Pass (*Dr. E. B. Worthington*). Like the Umtali specimen with metallic abdomen and small spots on scutellum.

Crocisa calceata Vachal.

Cape Province : Boshof, Oct. 1926, six (*R. Nel.*) These have hardly any trace of blue.

Orange Free State : Gum Tree, Feb. 29 (*A. Mackie*). Markings pale blue. This is a male, and has a pit on last sternite, contrary to the statement in Friese's table.

Belgian Congo : Kisantu (Lower Congo), five (*R. P. Vanderyst*); Kafubu Mission, Katanga, Sept. 1931 (*J. Ogilvie*); Sakania, Katanga, Sept. 1931 (*A. Mackie*).

S. Rhodesia : Christmas Pass, Umtali, May (*J. Ogilvie*).

N.E. Rhodesia : Niamadzi River, near Nawalia, 2,000 ft., Aug. 1910 (*S. A. Neave*).

Central Angoniland : Lilongwe District, 4,000–5,000 ft., May–June, 1910 (*Neave*).

Kenya : Fort Hall to Embu Road, 5,000 ft., Feb. 1911 (*Neave*); Nandi Escarpment (forest), 5,800 ft., May 1911 (*Neave*); Nasisi Hills, 20 miles north of Mumias, 4,800 ft., June 1911 (*Neave*).

Nyasaland : Valley of S. Rukuru River, 3,000 ft., June 1910 (*Neave*); Valley of N. Rukuru, Karonga District, 2,000 to 4,000 ft., July 1910 (*Neave*).

Uganda : Top of Escarpment, East of Butiaba, Lake Albert, 3,200 ft., Dec. 1911 (*Neave*); Mabira Forest, Chagwe, 3,500–3,800 ft., July 1911 (*Neave*); Western Ankola, 4,500–5,000 ft., Oct. 1911 (*Neave*); Bugoma Forest, Unyoro, 3,700 ft., Dec. 1911 (*Neave*).

Crocisa concessa sp. n.

♀. Length about 14 mm., anterior wing 10·3; robust, black, including legs, tegulae and antennae; pubescent markings mainly white, faintly tinged with fulvous, but faintly bluish on clypeus, and the abdominal markings distinctly bluish in part, especially the proximal ends; labrum dark red, with a median sulcus, and four elevations or bosses in a transverse row, the outer ones with brighter red spots; clypeus and sides of face densely covered with hair; cheeks hairy, the hair very dense and white next to eyes; white occipital fringe entire; rather short black hair behind the ocelli; the ocelli are in a transverse row; front shining, with sparse strong punctures; third antennal joint slightly longer than fourth; tubercles large and shining, their hair entirely dark; anterior thoracic spots widely separated in middle, but united to lateral mesothoracic bands; median stripe and discal spots very distinct, the spots separated from stripe by an interval at least equal to their diameter; posterior mesothoracic spots broadly triangular, narrowly connected with lateral bands; exillae with large well-defined spots, occupying the part next to scutellum; scutellum with margin ~ like, with no discal spots, but a crescentic mark above middle of incision; long white hairs from beneath incision; upper half of pleura with white hair, and thorax beneath with three white spots on each side; tegulae with a white spot behind and a smaller one in front; wings reddish-fuliginous, not excessively dark, the hyaline markings poorly developed; basal nervure going far basad of nervulus; marks on first tergite something like a crocodile's mouth, wide open, the branches long and slender, almost meeting anteriorly, posteriorly more widely separated; lateral bans on tergites 2 to 5 successively small, rounded mesad, the band on second without an upward projection; fifth sternite with a strong keel (as in *C. carinata* Friese); sides of sternites with spots of white hair.

Belgian Congo : Thysville, 15° E., 5° 30′ S., June 1915 (*J. Bequaert*). From the Salt collection, now in the British Museum. In Meyer's table it runs

to *C. excisa* Friese, but differs by the spots on axillae and venter, and other characters. It is near to *C. fenistriculipennis* Strand, but is distinguished by the anterior spots on thorax widely separated, marks on thorax above yellowish and more sharply defined, scutellum with a crescentic median mark, apical bands of first tergite narrower and less widely separated, and posterior mesothoracic marks narrowly joined to lateral bands. It also resembles *C. simulans* Ckll. (of which a female is before me, collected by Dr. J. W. S. Macfie, Nov. 14, 1911, at Zungeru, N. Nigeria), but differs by the paler wings, yellowish tint of thoracic markings, incision of scutellum forming a much wider angle, arms of marks on first tergite much longer, and light green (instead of reddish) eyes.

Crocisa concessa katangana subsp. n.

♀. Wings (anterior wing 11 mm. long) darker and blacker; incision of scutellum not forming so wide an angle, and no hair-mark on scutellum above the incision; yellowish tint of thoracic marks as in *C. concessa*; median band of mesothorax wider. It is easily known from *C. fenestriculipennis* Strand and *C. incisa* Friese by the smooth polished region on mesothorax mesad of the discal spots, the white hair on venter, and the hind basitarsi with much white hair. It is much larger than *C. cyanescens* Ckll., and has much paler abdominal bands.

Belgian Congo: type from Lubumbashi, Katanga, Jan. 1, 1926 (*Michael Bequaert*). From the Salt collection, now in the British Museum. Also one from Elisabethville, Jan. 30, 1931 (*Michael Bequaert*), in the Congo Museum.

Crocisa delagoana Cockerell.

Kenya: Rabai, May 1928 (*Dr. Van Someren*). Described from Delagoa Bay.

Crocisa fenestriculipennis Strand.

Belgian Congo: Kisantu (Lower Congo), two males (*R. P. Vanderyst*). The axillae have small spots of white hair; apex of abdomen narrow and bidentate.

Crocisa interrupta ugandensis Cockerell.

Belgian Congo: Kabaki, Walikale, 1° 25′ S., 28° E., Jan. 4, 1915 (*J. Bequaert*).

Crocisa laticauda sp. n.

♂. Length about 15 mm., anterior wing 13; very robust, black, including legs, antennae and tegulae; markings of abdomen very bright cobalt blue, of head and thorax pale blue, but the small discal spots of mesothorax (which are nearer to lateral bands than to median one) and the occipital fringe (which is interrupted in middle) are white; there is an interval between the white occipital fringe and the blue hair of the cheeks; labrum with a shining brownish tubercle at each side, and between these a pair of black shining discs; sides of vertex smooth and polished; median blue band of mesothorax slender; anterior lateral spots transverse, widely separated, and also widely separated from the lateral bands; posterior spots large, transversely oval, separated from the lateral bands; scutellum and axillae without light markings, but white hair projects from beneath scutellar incision; margin of scutellum W like; wings very dark, the hyaline spots small; blue hair on upper part of sides of thorax almost divided into two patches; lower part of mesopleura with a band of blue hair; basitarsi covered with blue hair on one side; middle tibiae with a bluish-white patch at base, anteriorly extended into a line running the whole length of tibia,

posteriorly with a less well-developed line; hind tibiae behind with less than basal half covered with blue hair; abdomen not metallic; first tergite with a pair of very large widely separated blue patches, which are strongly concave in outline mesad; tergites 2–5 with successively smaller lateral patches, that on second without any extension basad; venter with small blue spots; apex of abdomen very broadly truncate, the corners salient.

KENYA: Nairobi, July 1930 (*Van Someren*). Imperial Institute of Entomology. Runs to *C. scotaspis* Vachal in Meyer's table (1921), but easily distinguished by the broadly truncate, not tridentate, end of abdomen.

Crocisa maculiscutis Cameron.

UGANDA: Madi, May (*G. D. H. Carpenter*). Variety with posterior spots of mesothorax joined to lateral bands.

N. RHODESIA: Sinapunga, Feb. 13 (*Silverlock*).

NYASALAND: Chiromo (*R. C. Wood*).

CAPE PROVINCE: Huguenot, Feb. (*J. Ogilvie*).

S.W. AFRICA: Otairfontein, Dec. 30 (*L. Ogilvie, J. Ogilvie*).

ORANGE FREE STATE: Bosrand Afdeling Farm, March 30 (*J. Ogilvie*).

Crocisa meripes Vachal.

NYASALAND: side of Mt. Mlanje, 3,000–4,000 ft., Dec. 3, 1913 (*S. A. Neave*).

GOLD COAST: 1921–22 (*G. S. Cotterell*).

LIBERIA: Lenga Town, Aug. 15, 1926 (*J. Bequaert*); Moala, Oct. 31 (*J. Bequaert*).

BELGIAN CONGO: Kisantu (Lower Congo), six (*R. P. Vanderyst*).

UGANDA: 1918 (*J. R. Yardley*).

Crocisa oxyaspis sp. n.

♀. Length about 14 mm., anterior wing 11; very robust, black, the abdomen without metallic tints; legs, antennae and tegulae black; pubescent markings clear white, not at all blue, the hair of the thoracic markings long and loose (suggesting *C. lanosa* Friese); labrum dull, with a small shining tubercle on each side, but unmodified between these; sides of face densely hairy; clypeus with little hair, and with indications of a longitudinal raised line; sides of vertex shining but punctured; occipital fringe well developed, continued without interruption to cheeks, which have outstanding white hair on more than upper part, but not below; thorax with a very broad but short median band, and no discal spots; anterior spots of long and loose hair, more or less continuous across the middle but widely separated from the lateral bands; there is a thinner pointed or triangular extension backward from each anterior spot; lateral bands represented by large pyriform patches, remote from the posterior spots; posterior spots of mesothorax large, subpyriform, widely separated; scutellum and axillae immaculate, but very long white hair from below incision; margin of scutellum ⌒ like, but the apical angles produced and very sharp; white patch occupying upper part of mesopleura not divided; a tuft of white hair behind middle legs; tegulae without hair spots; wings brown, not very dark; hind femora unarmed; front tibiae densely covered with white hair on outer side, on middle tibiae about the basal two-thirds are covered, on hind tibiae about half; hind basitarsi with rather thin white hair; abdominal markings lateral, very widely separated, on first tergite excavated mesad, with a projecting angle, the whole mark rather like a bird's head and neck upside down; mark on second tergite without any extension basad; mark on fifth almost round; venter immaculate; fifth sternite with only weak indications of a keel.

Natal : National Park, March 3–15, 1932 (*L. Ogilvie*). In Meyer's table it runs near *C. nubica* Lep., or (on account of the loose hair) *C. lanosa* Friese, but it is quite distinct by the character of the scutellum, lack of discal spots on mesothorax, etc. There is some resemblance to *C. kabetensis* Ckll., but the abdominal marks are much more widely separated than in that species, and the scutellum is quite different.

Crocisa picta Smith.

Belgian Congo : Sankuru, Komi, Feb. 9 (*J. Ghesquière*); Equateur (*R. P. Hulstaert*). The Sankuru one has the abdominal bands denuded of the blue scales, leaving the surface of grey hairs beneath. *C. sordida* Ckll. from Java was apparently based on such a denuded specimen, and Meyer was right in treating it as a synonym of *C. abdominalis* Friese.

Crocisa plumifera Brauns.

S.W. Africa : Omaruru, Jan. 15, 1934 (*J. Ogilvie*). Contrary to the opinion of Dr. Meyer, I believe this to be a valid species.

Crocisa scotaspis Vachal.

Many years ago I received from Vachal a male *Crocisa* with beautiful blue markings, labelled *C. splendidula* Lepeletier, with no better locality than "Africa," The scutellum and axillae are immaculate, but there are bluish hairs below the scutellar incision, easily overlooked because pushed aside by the pin, which is inserted at that point. The first tergite has on each side a large quadrate blue patch, of which the inner apical corner projects mesad. The caudal end is strongly tridentate, all three teeth sharp. This can only be referred to *C. scotaspis*, described by Vachal from the female, but now known to have the end of abdomen tridentate in the male.

I find that a male from Nairobi, July 1930 (*Van Someren*), which I had referred to *C. scotaspis*, although in general exactly like that species, has the end of abdomen quite different, and must be placed elsewhere. It runs exactly to *C. scotaspis* in Meyer's table, but does not agree with his description. It is to be called *C. laticauda* sp. n. (p. 46).

Crocisa simulans Cockerell.

N. Nigeria: Zungeru, Nov. 14, 1911 (*Dr. J. W. S. Macfie*). Variety with dusky reddish femora.

Crocisa valvata Brauns.

Cape Province : Matjesfontein, Dec. 1928 (*R. E. Turner*); Mossel Bay, May and October (*R. E. Turner*). The combined series includes ten specimens, all with the axillae immaculate.

Crocisa valvata candida (Cockerell).

Orange Free State : Ficksburg, Feb. 26–March 1 (*Alice Mackie*); Donkerspoort, April 8, 1934 (*J. Ogilvie*).